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ECONOMIC AND FINANCIAL FEASIBILITY OF POMEGRANATE CULTIVATION IN CHITRADURGA DISTRICT OF KARNATAKA

SAHANA R.T., VENKATAMANA M. N., & ANITHA S.

Department of Agricultural Economics University of Agricultural Sciences, Bengaluru, Karnataka, India

ABSTRACT

India is one of the leading countries in pomegranate production with more than 1.32 lakh ha area is under pomegranate cultivation. Where in, Karnataka is the second largest pomegranate producing state which accounting for 19.2 per cent of total production in the country. Hence, the study was carried out to analyse the economic and financial feasibility of pomegranate cultivation in Chitradurga district of Karnataka. The results revealed that, the total establishment cost of pomegranate orchard per ha was Rs. 4,44,034. The annual total cost incurred by farmers to maintains the pomegranate orchard in study area was of Rs. 3,05,106. The average quantity of pomegranate fruit yield per ha was 9.71 mt. The gross returns were Rs. 5, 97,359. The net returns per hectare was of Rs. 2, 92,253 per year. The net present value of net returns of the project discounted at the opportunity cost of capital at 8 per cent was positive of Rs. 12,80,134. The B:C ratio was 1.60 and IRR was 65 per cent in the study area. The payback period was 1.68 year for the pomegranate orchards in Chitradurga district.

KEYWORDS: Pomegranate Production, Discounted at the Opportunity

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Original Article

INTRODUCTION

Pomegranate (*Punica granatum*) belongs to family *Punicaceae* is one of the commercially important fruit crops of India, which is native to Iran (Persia). It is currently ranked 10th in terms of fruit consumed annually in the world. There is tremendous potential for Indian pomegranates in the global markets. Karnataka has been the first state in the country, to set-up a separate department for the development of horticulture in the year 1965, because of its ideal agro-climatic condition and enterprising farming community.

India is one of the leading countries in pomegranate production and presently more than 1.32 lakh ha area is under pomegranate cultivation. Wherein, nearly 94,000 ha area is covered in Maharashtra, with the production of over one lakh Mt worth about Rs. 400 cores. Karnataka is the second largest pomegranate producing state accounting for 19.2 per cent of total production in the country. Further, the state is producing about 1,98,600 Mt of pomegranate from an area of 18400 ha. The productivity of pomegranate in the state is 10.75 t/ha. The major pomegranate producing belts are Chitradurga, Bijapur, Tumkur, Dharwad and Bagalkot districts. With this background, the study made an attempt to work out the Economics of pomegranate cultivation in Chitradurga district of Karnataka state.

METHODOLOGY

The present study was purposively undertaken in Chitradurga district of Karnataka state as the area under

pomegranate crop is significantly higher. Two taluks were selected from that five villages were samples were drawn based on the highest area under pomegranate cultivation. A random selection of six sample respondents of pomegranate cultivators was made from each village to constitute a total of 60 respondents. The primary data required for the study was collected from the sample farmers through personnel interview method with the help of a pre-tested comprehensive interview schedule.


Plates 1: Pomegranate Orchard

Analysis of Data

The data elicited was analyzed by using tabular and financial analysis techniques. The technique of tabular analysis was employed for estimating the investment pattern, maintenance cost, pattern of labour use, yield and return structure; and marketing cost of pomegranate, etc. In order to know the financial profitability of investment in pomegranate cultivation, the project evaluation measures namely, net present value (NPV), benefit cost ratio (BCR), internal rate of return (IRR) and payback period (PBP) were computed.

Estimation of Costs and Returns

The costs were classified into variable and fixed costs. Variable costs include cost of inputs (planting material, farm yard manure, fertilizer, plant protection chemical, *etc*), labour cost and interest on working capital. Fixed costs include land revenue, depreciation on farm implements, rental value of land and interest on fixed cost. The measurement and definitions of various cost components are as follows.

- **Establishment Cost**

It is the cost incurred during the first 18 months of the establishment of pomegranate cultivation. The costs incurred under this comprise land preparation, digging of pits, manure and tank silt application, planting and filling of pits, fertilizer application, pruning, plant protection chemicals application, staking, weeding and fencing. The total establishment cost was divided in two broad categories such as variable cost and fixed cost

- **Variable Costs**: This comprise of labour cost and material cost.

- **Labour Cost**

The expenditure incurred on human labour and machine labour constituted the labour costs. In case of human labour, the total labour employed for each activity was recorded. The women labour was converted into man days by multiplying each women day with 0.6 being the ratio of wages of women to wages of man.

- **Material Cost**

Material costs covered expenditure on fencing, drip installation, tank silt, manures, fertilizers, plant protection chemicals, irrigation, planting material, staking material and miscellaneous. These costs were computed based on actual prices paid by the growers and prices prevailing in the locality for owned inputs.

- **Fixed Costs**

These include rental value of land, land revenue, depreciation on farm implements and machinery and interest on fixed capital.

Total Establishment Cost

Total establishment cost is the summation of total variable cost (labour cost, total material cost) and total fixed cost.

- **Annual Maintenance Costs**

Pomegranate starts bearing from 18 months onwards and subsequent yield is taken up every six months after the first harvest. The annual maintenance cost includes average cost of cultivation of two crops in a year, which consists of both variable and fixed costs.

- **Variable Cost**

The variable costs which include labour cost of weeding, tank silt, manures and fertilizer application, plant protection chemical application, pruning, watch and ward and harvesting, material cost includes wages for human, bullock and machinery labour, miscellaneous charges. Marketing cost includes (box charges, cello tape, grading and packing and commission charge at 2 per cent).

- **Fixed Costs**

Tank silt, manures, fertilizers, plant protection chemical irrigation charges and interest on working capital @ 10 per cent per annum. These include rental value of land, land revenue, depreciation on farm implements and machinery and interest on fixed capital and annualized establishment cost.

RETURNS STRUCTURE

The returns include average returns from 18 months onwards up to 10^{th} year's age of pomegranate orchards.

- **Gross Returns**

It is obtained by multiplying the total product with its sale price per kg.

- **Net Returns**

It is obtained by deducting the total costs incurred from the gross returns.

- **Returns on Variable Cost**

It is calculated by subtracting variable costs from gross returns.

- **Returns Per Rupee of Investment**

Return per rupee of investment was calculated by dividing gross return by total costs.

RESULTS AND DISCUSSIONS

Establishment cost of pomegranate orchards:

The details of establishment cost incurred for pomegranate orchards in the study area are presented in table 1. The findings revealed that the total establishment cost was of Rs. 4, 44,034 per ha. Further, the labour cost was of Rs. 95, 169 (21.43 %) and material cost of Rs. 2, 65,527 (59.80 %). Out of the total labour cost, the expenditure made on pruning was accounted for the highest per cent (9.69 %) followed by digging of pits (3.63 %).

Among the material costs, the major share of Rs. 64,964 (14.63 %) was spent towards drip materials, followed by fencing around the orchard of Rs. 43,829 (9.87 %) purchase of staking material of Rs. 37,691 (8.49 %), planting material of Rs. 26,692 (6.01 %), plant protection chemicals of Rs. 29,846 (6.72 %), fertilizers of Rs. 25,842 (5.82 %), manures of Rs. 17,864 (4.02 %), irrigation cost of Rs. 10,588 (2.38 %), tank silt of Rs. 68,75 (1.55 %) and miscellaneous costs of Rs. 1,336 (0.30 %).

The total fixed cost of pomegranate orchards in the was of Rs. 47,268 (10.65 %), of which major portion was rental value of land of Rs. 23,868 (5.38 %) and interest on fixed capital of Rs. 20,687 (4.66 %). Similar results were obtained by Ravikumar (2009).

Annual Maintenance Cost of Pomegranate Orchards

The average annual maintenance cost per hectare incurred by pomegranate growers in the study area is presented in table 2. The average per ha maintenance cost incurred by pomegranate growers was of Rs. 3,05,106, of which the total variable cost was accounted of Rs. 2,03,098 (66.57 %) and fixed costs accounted for 33.43 per cent (Rs.1,02,008).

Among variable costs, labour component was of Rs. 66, 659 (21.85 %), of which major item was pruning which was of Rs. 39, 036 (12.79 %) followed by cost for watch and ward of Rs. 7,900 (2.59 %), manures and fertilizer application cost of Rs. 6,192 (2.03 %) harvesting cost of Rs. 6,138 (2.01 %), plant protection chemical application cost of Rs. 3,729(1.22 %) and weeding cost of Rs. 3,664 (1.20 %).

It was observed that annual average cost of plant protection chemicals was of Rs. 32,684 which formed 10.71 per cent of the total maintenance cost followed by cost on fertilizers Rs. 24,431 (8.01 %), cost of manures of Rs. 20,325 (6.66 %), irrigation charges of Rs. 10,588 (3.47 %), tank silt cost of Rs. 5,954 (1.95 %) and miscellaneous cost of Rs. 1,710 (0.56 %). With respect to the marketing of pomegranate, it accounted for about of Rs. 24,512 (8.03 %) of the total annual maintenance cost. The major cost items included in the marketing cost were packaging materials (boxes) to an extent of Rs. 9360 (3.07 %), labour charges for grading and packing of Rs. 2,825 (0.93 %), commission charges of Rs. 11,947 (3.92 %) and cello tape of Rs. 380 (0.12 %).

The total fixed cost accounted for 33.43 per cent (Rs. 1,02,008) of which annualized establishment cost was highest of Rs. 75,243 (24.66 %), followed by rental value of land of Rs. 23,839 (7.81 %), depreciation charges of Rs. 2,674 (0.88 %), interest on fixed capital of Rs. 217 (0.07 %) and land revenue of Rs. 35 (0.01 %) the results were in conformity with Ramachandra (2006) and Ravi Kumar (2009)

Costs and Returns of Pomegranate Cultivation in the Study Area

The average yield of pomegranate obtained by the sample farmers in the study area was 9.71 mt per ha and gross income was of Rs. 5, 97,359 per year. The cost of production was to be of Rs. 31,421 mt. The total annual cost incurred was of Rs. 3,05,106 and the net return was of Rs. 2,92,253. Similar results were noticed from the studies conducted by Raikar (1990) and Ravikumar (2009) (Table 3).

Evaluation of Investment on Pomegranate Cultivation

In order to examine the financial feasibility of investments on pomegranate cultivation, measures of project appraisal were applied. The results of finalized analysis are presented in table 4. The measures computed were payback period, net present value, benefit cost ratio and internal rate of return.

Payback Period (PBP)

The payback period refers to the time required for the project to pay its initial investment incurred in establishing the orchard. In pomegranate, the payback period was 1.68,

Net Present Value (NPV)

The net present value is simply the present value of net returns of the project discounted at the opportunity cost of capital (8 %). The per ha net present values of pomegranate cultivation was of Rs. 12,80,134. This was in confirmation with the research findings of Ravikumar (2009), Sundaravardarajan, Raikar (1990) and Subrahamanyam (1987).

Benefit Cost Ratio (BCR)

The benefit cost ratio was obtained by taking the ratio between the discounted net returns to the discounted cost. The net present value of costs and returns were obtained by discounting the cost and returns by the opportunity cost of capital. The benefit cost ratio in pomegranate cultivation was 1.60, at 8 per cent discount rate. These results are in confirmation with the findings of Ravikumar (2009) and Koujalagi (1990).

Internal Rate of Return (IRR)

This represents the rate of return over the life period of the project. The internal rate of return was computed by interpolating two discount rates. The internal rate of return in pomegranate cultivation was 65 per cent. The internal rate of return was higher than the opportunity cost of capital of 8per cent. This indicates the average earning power of money invested in the project was found to be higher. Similar results were recorded from the studies conducted by Ravikumar (2009), Anonymous (2003), Koujalagi (1990) and Ramachandra (2006).

The fore going analysis revealed that, net present worth was positive, Benefit Cost ratio was greater than one and internal rate of return was higher than the opportunity cost of capital (at 8%).The investments in pomegranate crop can be recovered after planting. Thus, the results of this study clearly revealed that investments in pomegranate orchard were economically viable.

CONCLUSIONS

The establishment cost of pomegranate orchards was accounted was of Rs. 4,44,034 per hectare. The per year per hectare total cost incurred by farmers was of Rs. 3,05,106. The gross return received was of Rs. 5,97,359 per hectare. The net returns per hectare was of Rs. 2,92,253 per year. The per ha net present values of pomegranate cultivation was of

Rs. 12,80,134. The benefit cost ratio in pomegranate cultivation was 1.60, at 8 per cent discount rate. The internal rate of return in pomegranate cultivation was 65 per cent. The internal rate of return was higher than the opportunity cost of capital of 8per cent. The study indicated that pomegranate cultivation is a very profitable enterprise. Hence, this needs to be popularized among farmers by the agricultural extension agencies.

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APPENDICES

Table 1: Establishment Cost of Pomegranate Orchards (Rs. /Ha)

Sl.No.	Particulars	Unit	Quantity	Cost	Per cent
A.	**Labour Cost**				
1	Preparation of land	Machine hours	6.98	5962	1.34
2	Digging of pits	No.	892	16128	3.63
3	Manure and tank silt application	Man days	27.43	6858	1.54
4	Planting and filling of pits	Man days	19.11	4778	1.08
5	Fertilizers application	Man days	15.25	3812	0.86
6	Pruning	Rs.		43029	9.69
7	Plant protection chemical application	Man days	17.92	4480	1.01
8	Staking	Man days	16.63	4157	0.94
9	Weeding	Man days	9.98	2495	0.56
10	Fencing	Man days	13.88	3470	0.78
	Total labour cost			95169	21.43
B.	**Material Cost**				
1	Fencing	Rs.		43829	9.87
2	Drip material	Rs.		64964	14.63
3	Tank silt	Mt	19.87	6875	1.55
4	Manures	Mt	8.56	17864	4.02
5	Fertilizers	Kg	762.19	25842	5.82
6	Plant protection chemicals	Lit	12.85	29846	6.72
7	Irrigation	Rs.		10588	2.38
8	Planting material	No.	920	26692	6.01
9	Staking material	No.	7352	37691	8.49
10	Miscellaneous	Rs.		1336	0.30
	Total material cost			265527	59.80
	Interest on working capital @ 10 %			36070	8.12
	Subtotal (A+B)			396766	89.35
C.	**Fixed Cost**				
1	Land revenue			35	0.01
2	Depreciation	-		2678	0.60
3	Rental value of land			23868	5.38

Table 1: Contd.,					
	Interest on fixed capital @ 8 %			20687	4.66
	Total fixed cost			47268	10.65
	Total cost (A+B+C)			444034	100.00

Table 2: Annual Maintenance Costs of Pomegranate Orchards (Rs. /Ha)

Sl.No.	Particulars	Unit	Quantity	Cost	%
I.	**Variable Cost**				
A.	**Labour Cost**				
1	Weeding	Man days	14.655	3664	1.20
2	Manure and fertilizer application	Man days	24.76	6192	2.03
3	Plant protection chemical application	Man days	14.91	3729	1.22
4	Pruning	Rs.		39036	12.79
5	Watch and ward	Rs.		7900	2.59
6	Harvesting	Man days	24.55	6138	2.01
	Total labour cost			66659	21.85
B.	**Material Cost**				
1	Tank silt	t/ha	15.605	5954	1.95
2	Manures	t/ha	9.915	20325	6.66
3	Fertilizers	Kg		24431	8.01
4	Plant protection chemicals	Lit		32684	10.71
5	Irrigation charges	Rs.		10588	3.47
6	Miscellaneous	Rs.		1710	0.56
	Total material cost			95692	31.36
	Interest on working capital @ 10 %			16235	5.32
	Total (A+B)			178586	58.53
C.	**Marketing Cost**				
	a) Package material (Boxes)	No.	780	9360	3.07
	b) Cello tape	No.	10	380	0.12
	c) Grading and packaging (labour)	Man days	11.3	2825	0.93
	d) Commission @ 2 %			11947	3.92
	Total marketing cost			24512	8.03
	Total variable cost (A+B+C)			203098	66.57
II.	**Fixed Cost**				
1	Land revenue			35	0.01
2	Depreciation			2674	0.88
3	Rental value of land			23839	7.81
4	Interest on fixed capital @ 8 %			217	0.07
5	Annualized establishment cost			75243	24.66
	Total fixed cost			102008	33.43
	Total cost (I + II)			305106	100

Table 3: Cost and Returns of Pomegranate Cultivation in the Study Area (For 2 Crops in a Year)

Sl. No.	Particulars	Chitradugra (N=60)
1	Yield (t/ha)	9.71
2	Price (Rs./kg)	61.52
3	Gross returns (Rs./ha)	597359
4	Total cost (Rs./ha)	305106
5	Net returns (Rs./ha)	292253
6	Cost of production (Rs./t)	31421
7	Returns on variable cost (Rs./ha)	394261

Table 4: Economics of Investment on Pomegranate Cultivation

Sl. No	Particulars	Unit	Chitradugra
1	Net Present Value (@ 8 %)	Rs	1280134
2	Benefit Cost Ratio (@ 8 %)	Ratio	1.59
3	Internal Rate of Return	%	65
s4	Payback Period	Years	1.68

Table 5: Cash Flow Analysis of Pomegranate Orchard in the Study Area

Year	Cost/Cash Outflow	Returns/Cash Inflow	Net income	Discount Factor at 8%	NPW (Rs.)
1	443126	0	-443126	0.93	-410302
2	305106	597359	292253	0.86	250560
3	305106	597359	292253	0.79	232000
4	305106	597359	292253	0.74	214815
5	305106	597359	292253	0.68	198902
6	305106	597359	292253	0.63	184169
7	305106	597359	292253	0.58	170527
8	305106	597359	292253	0.54	157895
9	305106	597359	292253	0.50	146199
10	305106	597359	292253	0.46	135370